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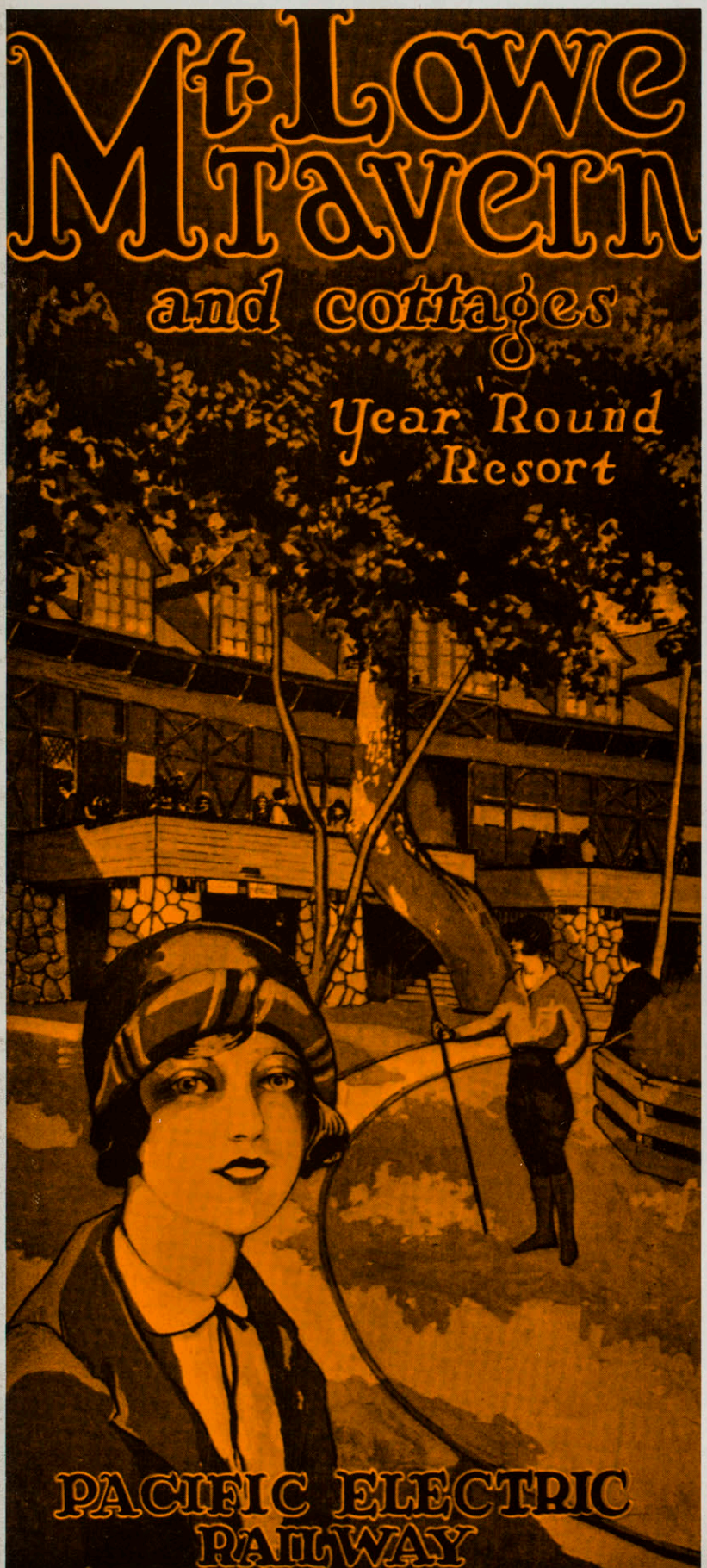
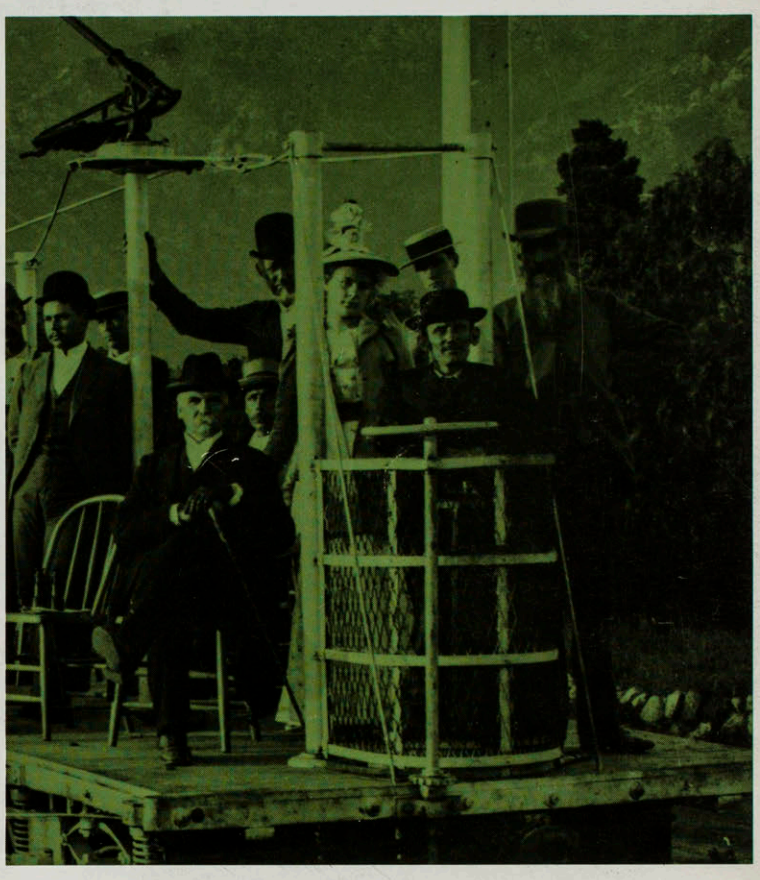
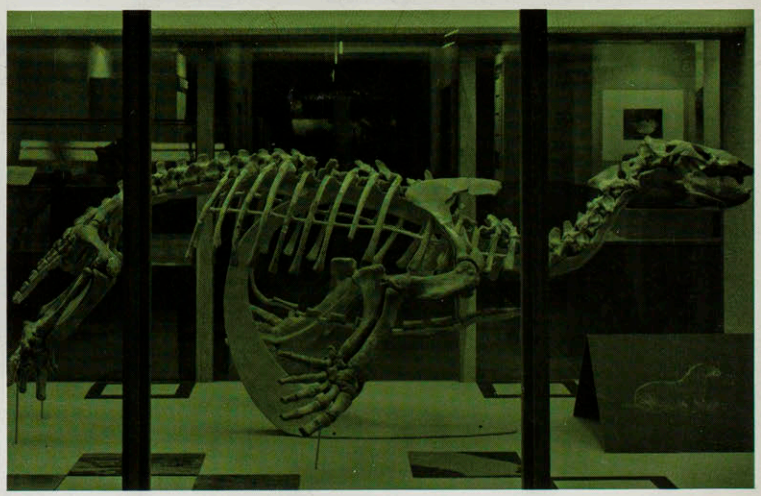
SCIENCE & HISTORY ALLIANCE

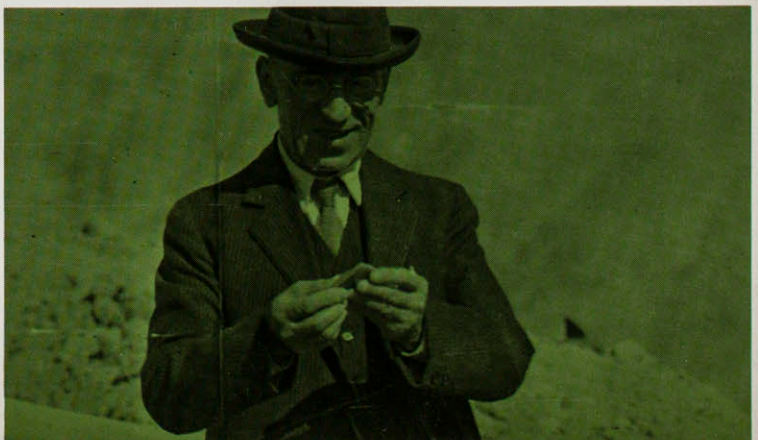
QUARTERLY

LOS ANGELES COUNTY MUSEUM / VOLUME 1 · NUMBER 2









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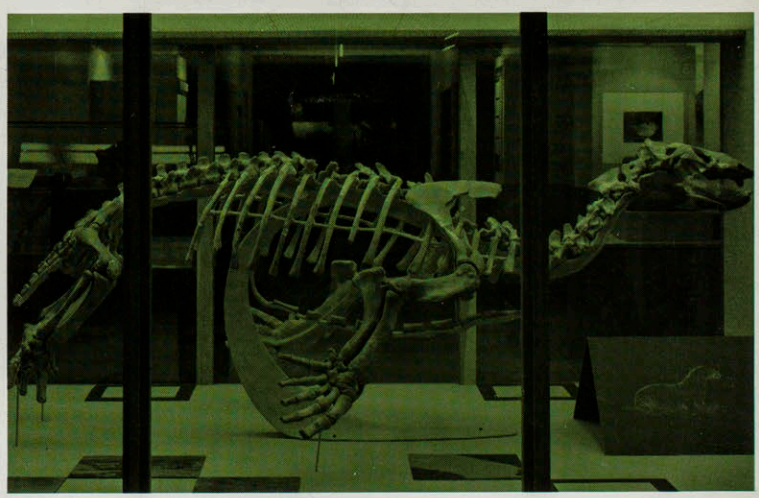

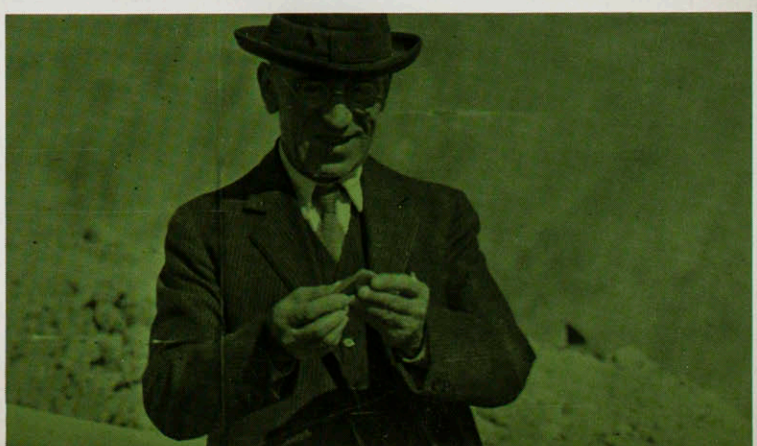

The tremendous success of the recent Museum Association Charter Flight to Paris is now history. Unlike much of recent history it will not soon be forgotten by the 140 persons who took advantage of this new membership benefit. Letters of praise are still arriving according to Miss Lucille Libow who coordinated this enormous project to the complete satisfaction of the flight group.

Special praise and appreciation go to Hoyt B. Leisure, President of the Association, who was in constant consultation with Miss Libow and Air France; and to the members of the Charter Flight Committee: Mr. A. R. Phillips, Jr., Mrs. Bradner W. Lee, Jr., and Mr. Harold P. Ullman.

Plans for a 1963 Charter Flight are now under way. According to international laws governing charter flights, to participate one must be a member of the sponsoring organization at the time the contract is signed, or six months prior to flight date.

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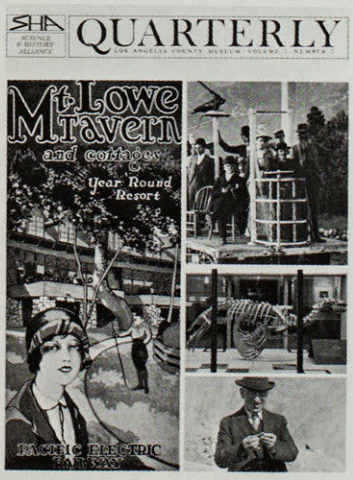

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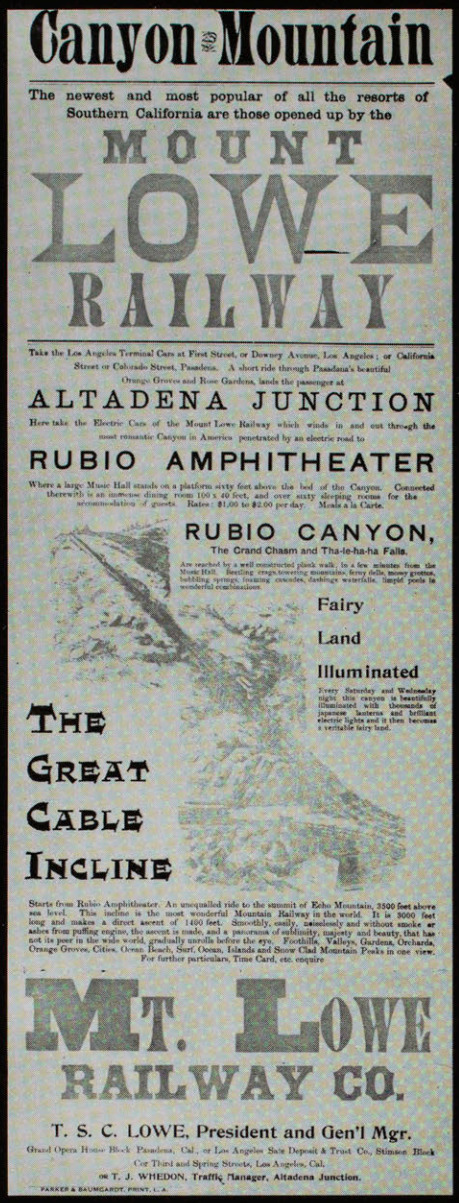
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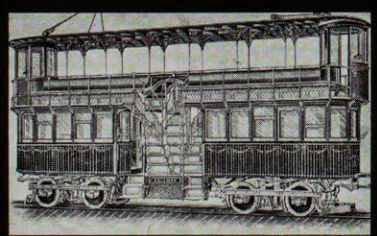
"Praise God from whom all blessings flow, And also praise Professor Lowe."



THE GREAT CABLE INCLINE—3000 feet long—ascends 1300 feet, the most wonderful railway in the world—To Echo Mountain House—Open all the year round. Unexcelled table, comfortable rooms, post office, public telephone. Here was the Echo Mountain Power House with its equipment of ingenious machinery for running what was aptly called a hotel elevator out of doors.

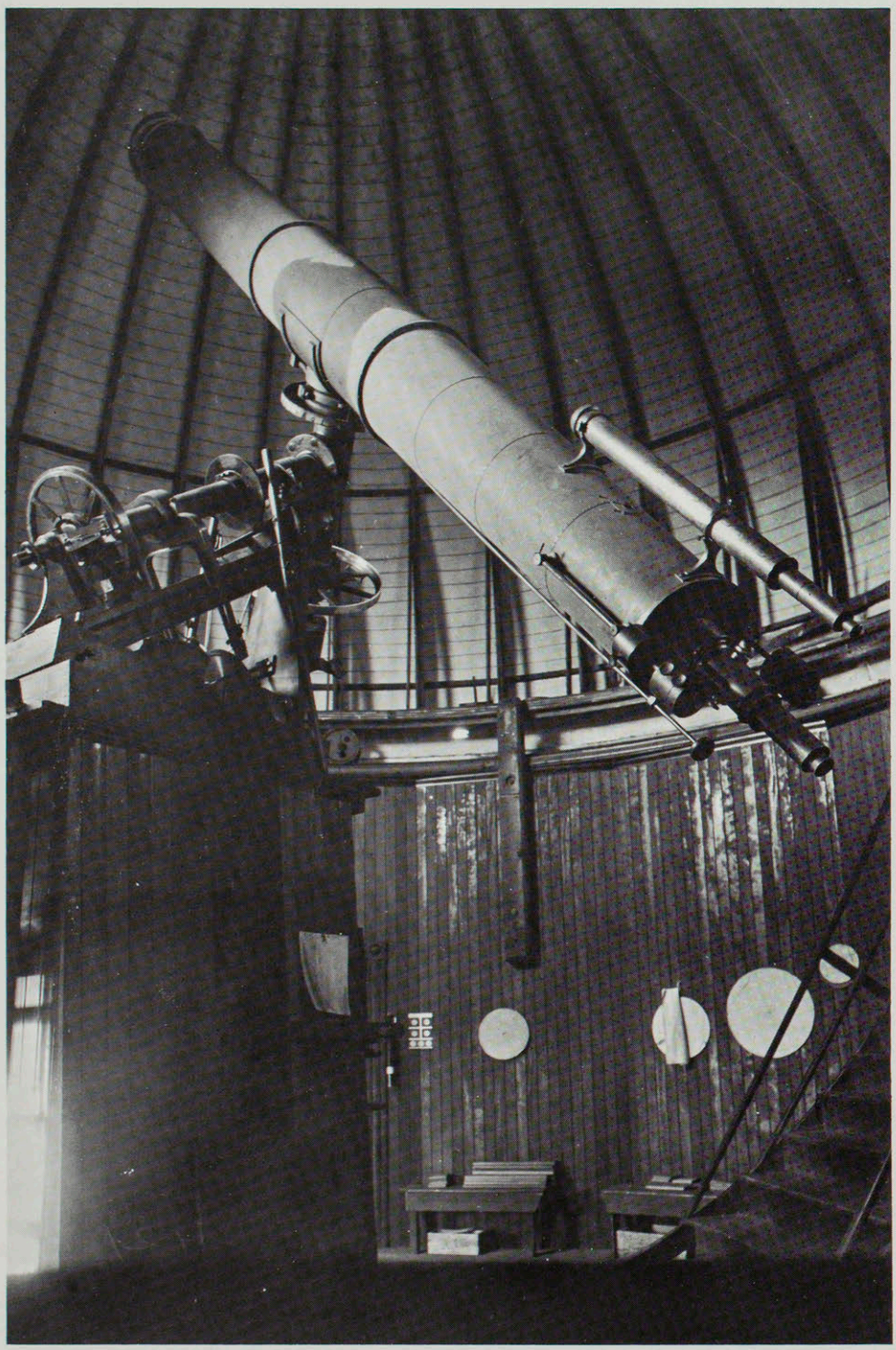
RAILWAY TO THE CLOUDS

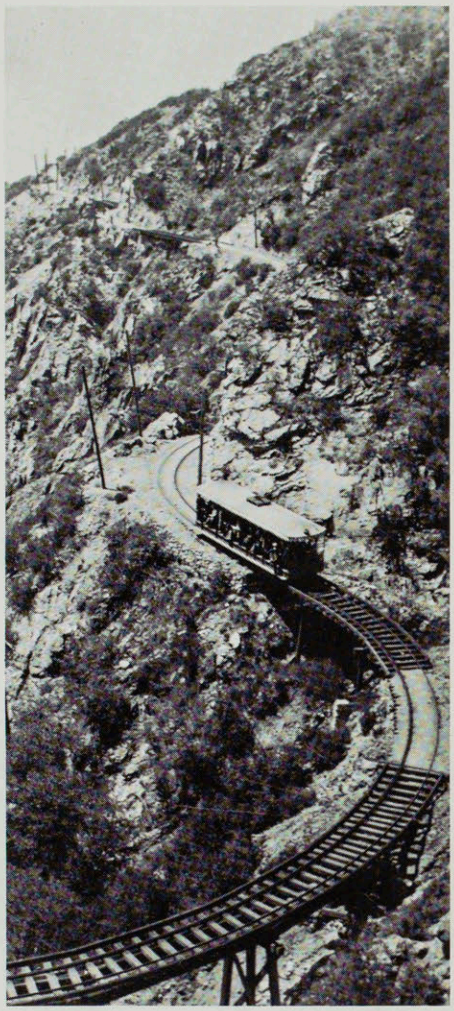
THE STORY OF MOUNT LOWE

RAILWAY TO THE CLOUDS

Seventy years ago when Professor Thaddeus S. C. Lowe came to Southern California, the mountain range rising above the San Gabriel valley was scenic enough to attract him to the proposed plans to reach its summit by means of a railway. Coming from the mountains of New Hampshire where he was probably familiar with the cog-wheel railroad on Mount Washington, he saw in the project a business enterprise which could be aligned with the interests of science. The result of his work was the Mount Lowe Railway which carried passengers to the top of the mountain named in his honor.

From Los Angeles, the Mount Lowe Line cars went to Pasadena, up Lake Avenue to Rubio Canyon. Here passengers were transferred to the incline railway which carried them to Echo Mountain and a trolley ride to the terminus at the Alpine Tavern. Two other inns were





Mount Lowe work car on Lake Avenue, Pasadena with Professor Lowe seated at front.

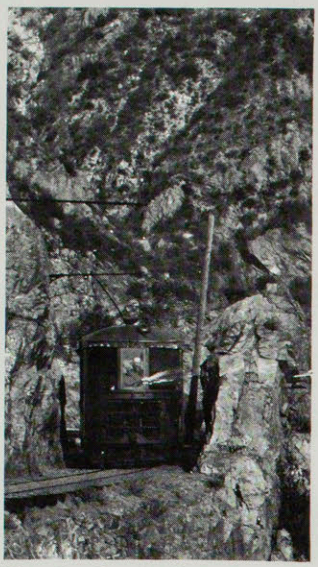
built, the Echo Mountain House of three stories with forty rooms, and at the Rubio Canyon transfer, a small hotel and pavilion. In 1894, an astronomical observatory was built on Echo Mountain and a fine six-inch telescope installed. The height of Mount Lowe is 6723 feet and it was the vantage point for the memorable view of the valley below and its tracts of brilliant poppies. A description of this tourist attraction was included in the famous Baedeker guide.

Professor Lowe lost control of his *railway to the sky* in 1896 and catastrophes doomed it. Once world famous and now forgotten, little is left but the name of a mountain to recall the memory of the man who originated the balloon corps of the U.S. Army and established telegraphic communication between the balloon and earth, invented the compression system of artificially manufacturing ice and pioneered the transportation of food by means of artificial refrigeration, invented water gas for illumination and developed the methods for its manufacture and distribution, and built the first electric railway in the world.

JOHN DEWAR, *History Division*

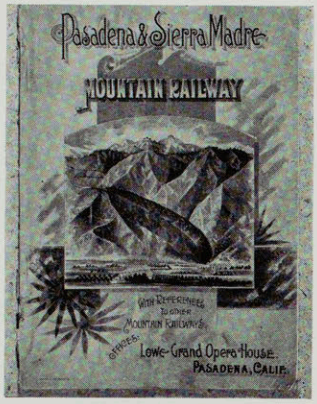
RAILWAY TO THE CLOUDS

The famous circular bridge was a "marvel of engineering skill and substantial construction."



"Granite Gate" where the roadway was blasted out of the solid rock of the mountain side.

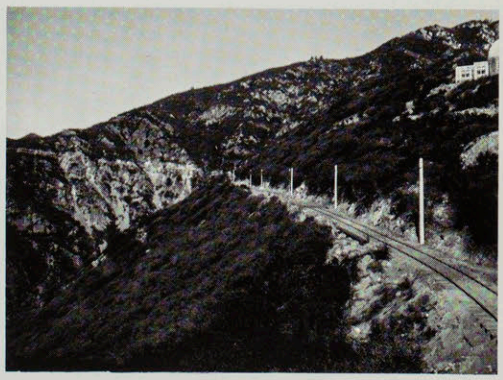
Mt. Lowe Alpine Tavern, twenty-four miles from Los Angeles, was situated at the terminus of the railway, in a forest of spruce, cedar and oak. It required two hours to make the trip.



Cover of a brochure describing the "Pasadena and Sierra Mountain Railway."

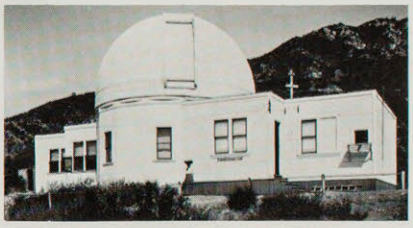
Here, at the Alpine Tavern daily, visitors could follow trails which radiated in various directions to Proposal Arbor, Inspiration Point, Easter Rock and others which afforded a view of the magnificent scenery.

So "crooked" was the road that the longest piece of straight track in the entire three and one-half miles was only two hundred and twenty-five feet in length, and the curves, if they were all in the same direction, would make more than sixteen complete circles.



Due to its unique railway Mt. Lowe attracted thousands of tourists and visitors; year-round.

"Ye Ornament of a House, is ye Guest who doth Frequent It." Lounge of the Alpine Tavern. Here were found all the conveniences of a modern hotel, bell boys, electricity, hot and cold running water, private baths, and an excellent heating system.

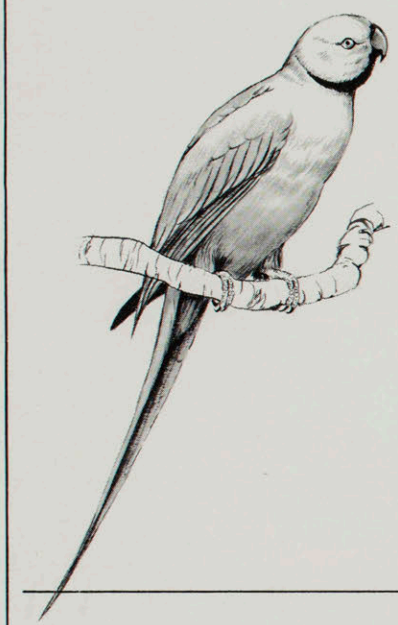


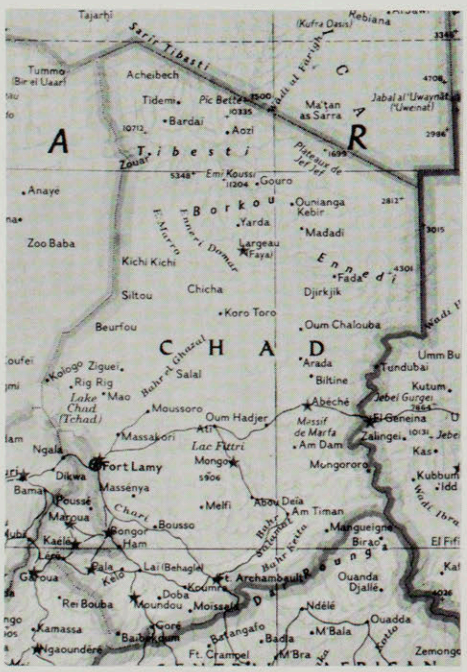
Lowe Observatory was open free to the public on Saturday, Sunday, and holiday evenings, when visitors could look through the big telescope.

Winter visitors were greeted with scenes like this.

Tchad Birds and the Sahara Problem

HERBERT FRIEDMANN
Director, Los Angeles County Museum





Collections of specimens, adequately prepared, documented, and identified, when added to the related material already in its storage cases, form the chief basis of the Museum's contributions to the advancement of knowledge in the natural sciences. Often these increments are small and, in themselves, may seem to be of no great interest. At times their usefulness and significance may not become evident until they are used in connection with other similar material in studies that may not even have been contemplated at the time they were received. It is part of the Museum's business to preserve and to identify all such specimens in the realization that they will prove useful, just as it is the business of a large library to maintain sets of periodicals and books even though some of these items may be consulted only infrequently. It is important to have them when they are needed, and this justifies their existence, their conservation, and their maintenance.

On the other hand, some donations of specimens are of sufficient inherent interest to warrant writing about them in a non-technical way. Outstanding among such collections is that amassed by the Machris Expedition to Tchad during the winter of 1960. The collections were primarily of mammals and birds, but important examples of reptiles and amphibians were also included. The collections of the last two groups of animals have already been studied and the information obtained from their study was published in the Museum's "Contributions in Science" series by David B. Wade and Arnold J. Kluge in May, 1961. A similar report on the mammals is in process and is not yet ready to be printed, but one on the birds has been completed and recently was published. Such reports place on record for the benefit of investigators in other institutions —museums, universities, etc.—the discrete, factual data, but they are not written for the use of non-specialist readers. The present account is intended to present in general terms something of the data and ideas that emanate from these studies.

The interest inherent in the zoology of the Republic of Tchad stems from the fact that this newly created independent nation lies partly in, and party to the south of, the Sahara. The Sahara is one of the greatest natural barriers to animal distribution. Because of its great size and its extreme aridity, with consequent lack of water and nourishment for any creatures that might stray far in it, the Sahara is much more effective as a barrier than is the Mediterranean to such highly mobile creatures as small birds, to say nothing of slower moving, earth-bound animals such as mammals, reptiles and amphibians.

Actually there are, for all practical purposes, three "bridges" by which non-aquatic creatures may cross, and have crossed in the past, from Europe to Africa. At the west end of the Mediterranean, Gibraltar practically touches Morocco; in the center, the long Italian peninsula and the "stepping stone" islands of Sardinia, Corsica and Malta greatly reduce the open water between Europe and Africa, and farther to the east the Greek islands, Cyprus, Rhodes and Crete, do the same. The Sahara provides no such highways except for the Nile Valley. Students of zoogeography, the science of animal distribution, have long ago recognized that Africa north of the Sahara is essentially European in its fauna and flora, and that the true African fauna does not occur north of the southern limits of the great desert. It is the Sahara, not the Mediterranean, that separates Africa from Europe biologically.

Although the Sahara must be looked upon as a major barrier for the distribution of birds, it is nevertheless a fact that it is crossed twice a year by a large proportion of all the small insectivorous birds breeding in Europe and western Asia. As Moreau has recently pointed out, the birds of most of Europe west of the Soviet Union not only have to cross the Sahara but also have to cross the Mediterranean. Because of the size of the desert, which averages about 900 miles across from north to south, and because of the fact that the area of Mediterranean Africa between the desert and sea is relatively narrow, the resulting combination of sea and desert with little resting space between them makes the migratory journey one of the most arduous and demanding to be performed regularly by vast numbers of small land birds anywhere in the world. As if this were not serious enough, there is some evidence that suggests that the main directions of migration are not due north and south, but southwest in the autumn and northeast in the spring, making the actual desert crossing considerably longer than 900 miles.

In other words, even an effective distributional barrier that limits the geographic range of many species of birds does so only as far as their breeding range is concerned. To migrating birds this awesome barrier is merely something to cross, non-stop if possible, but it obviously does not block their progress between their breeding range in the north and their winter home in the south.

The fact that the European fauna and the African fauna are very different and yet have some species in common makes it all the more interesting to determine just where in this broad expanse of sand, very sparsely dotted with habitable oases, the two faunas meet and which of their component members are the "marginal" pioneers of each.

The answer to this problem lies in the analysis of the resident bird populations, that is, of the birds that remain and nest, in each of the habitable oases in the desert country. Most of these oases are mountainous masses high enough to attract and to condense clouds, and large enough to hold this air-borne moisture and to make possible growth of vegetation.

Some forty years ago the large, then still mysterious, massif of Aïr or Asben, some 350 miles north in the desert from Kano, in northern Nigeria, was explored zoologically, and was found to have a typically African avifauna. The Hoggar Mountains, 300 miles further north, are, on the contrary, equally typically European in their bird life. In Tchad, the Ennedi Mountains, visited by the Machris Expedition, are now found to be purely African as far as their birds are concerned. It now becomes evident that Tchad does not extend far enough northward into the Sahara to encompass within its limits any area that might be looked upon as "palearctic" (the zoologists' term for European and north Asiatic) in its resident bird life. Another sizeable piece of the Saharan distributional picture has been filled in.

EDW. D. MITCHELL, JR.
Research Assistant in Vertebrate Paleontology

Just five miles northeast of Bakersfield and about one-quarter mile north of the Kern River, is a small hill, locally called "Sharktooth Hill." Located near one of the earliest oil fields in California, Sharktooth Hill is surrounded by other low, rolling hills and on a hot day presents an especially desolate appearance. No one lives in the area, though on weekends, when the temperature may be over 100°, as many as six hundred people may visit the prominence and dig pits into its slopes.

Improbable as it may seem, the rocks exposed at Sharktooth Hill contain one of the most abundant and diverse extinct vertebrate marine faunas in the world. Bones and teeth of various mammals, birds, reptiles and fishes can be collected here. By far the most common fossils are the many and varied types of shark teeth from which the hill takes its name.

EARLY COLLECTIONS

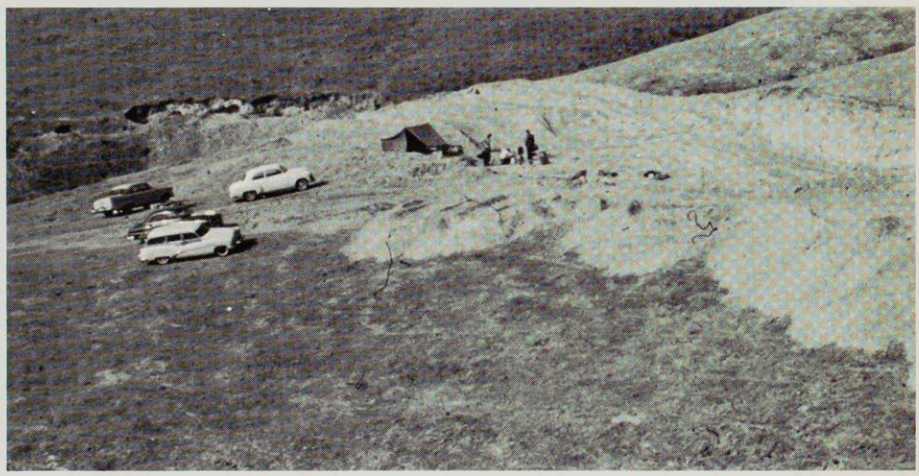
Some of the earliest vertebrates collected in California were fossil shark teeth picked up by W. P. Blake, geologist of the Williamson contingent of the Pacific Railroad Survey in 1853. These fossils were evidently collected from the same horizon but a few miles to the north of that exposed at Sharktooth Hill. The original location was cited as "Depot Camp" south of Poso Creek which has been variously called Pose' Creek and Ocoya Creek (spelled Ocaga Creek on one map). Blake's collections were described in 1856 by the noted zoologist and geologist Louis Agassiz.

The next noteworthy collection of shark teeth taken from the area was that assembled by Mr. John Barker from rocks at Barker Ranch, southeast of Sharktooth Hill. This collection, deposited in the California Academy of Sciences, was described by Dr. David Starr Jordan of Stanford University in 1907.

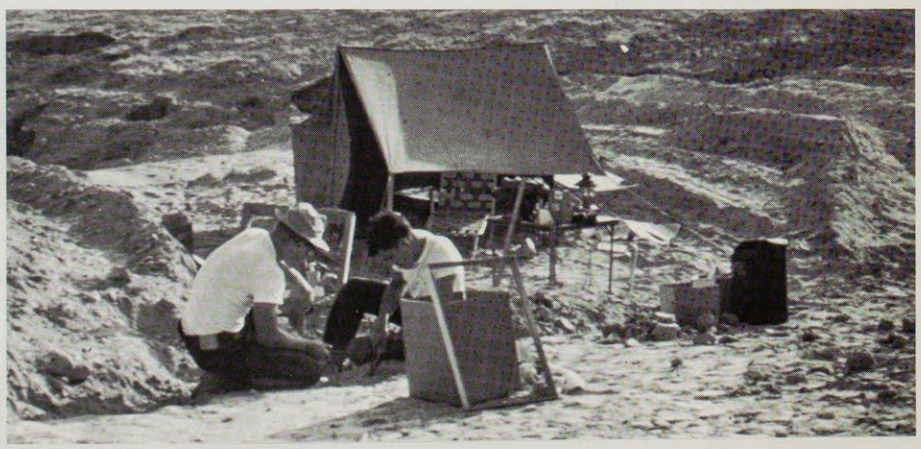
Mr. Charles Morrice examines tooth of the giant shark Carcharodon *in one of his pits at Sharktooth Hill about 1923. California Academy of Science photo.*

Bulldozer starts excavation of the Los Angeles County Museum's quarry at Sharktooth Hill in 1960. J. A. Arndt photo.

Los Angeles County Museum excavation at Sharktooth Hill, in October 1960. J. H. Lipps photo.



Paleontologists E. D. Mitchell, left and J. H. Lipps start to expose bones in bone bed. Bulldozer has removed all but a few inches from above the bed, shown as flat surface at lower right.



About November of 1909, Mr. Charles Morrice, an employee of Pacific Oil Company, became interested in collecting fossils from Sharktooth Hill. Over the next fifteen years he collected well-preserved specimens by the thousands. These formed the basis for much of the definitive scientific work published on the fauna. Such outstanding authorities as Dr. David Starr Jordan on sharks and fishes, Dr. Charles W. Gilmore on turtles, Dr. Alexander Wetmore on birds, and Dr. Remington Kellogg on marine mammals published papers based upon material collected by Morrice.

In the Fall of 1924, the California Academy of Sciences sponsored a program of excavation at the hill with Mr. Morrice in charge of the field work, and Mr. Tom Harbert, employed for a three-month period. A large collection of bones was gathered for the Academy and subsequently reported upon by experts. No further work was done at Sharktooth Hill on an extensive scientific basis until personnel of the Los Angeles County Museum became interested in the area.

THE BONE BED

The vertebrate fossils at Sharktooth Hill are found in a *"bone bed"* about three feet thick. The brown, sandy shales underlying the bone bed do not have vertebrates in them, and the siltstones overlying it are relatively unfossiliferous. Bones and teeth, however, are literally packed in the bone bed itself; one cubic foot of bone bed may contain over a hundred teeth and bones. Not limited to Sharktooth Hill, the bone bed extends for quite a few miles north from the hill, where it crops out in numerous small canyons and gullies. Only the dedicated amateur shark tooth collector ventures into this back country, for it takes a practiced eye to spot the bone bed and strong muscles to dig down to it and remove the fossils.

The most common method of collecting shark teeth is to dig a pit down to the level of the bone bed and then quarry into the side of the bed with picks and rock hammers. Teeth are found during this

SHARK-TOOTH HILL

Numerous large fragments of single whale skull in place in Sharktooth Hill bone bed. J. H. Lipps photo.

Complete skeleton of Kellogg's sea lion, Allodesmus, *found in Sharktooth Hill bone bed. Hind limbs are at top of photograph; skull at bottom. J. H. Lipps photo.*

SHARK-TOOTH HILL

operation; smaller teeth are recovered by screening the back dirt. Unfortunately, bones are usually broken using this method, and it becomes impossible to follow a single large bone back into the hill for more than a few inches.

All of the bones and teeth removed from the bone bed in the last fifty years have generally been regarded as dissociated elements, that is, none of the bones or teeth of one animal were found together, but parts of many different individual animals were somehow mixed and packed together. It is not clear how this condition came about. Simple mixing of bones by currents on the bottom of the ancient sea floor does not seem to be the answer, for in that case most of the bones would show signs of having been washed about and abraded. Actually some bones are abraded, and occur in the bone bed packed tightly against other, often more delicate bones which are in perfect shape. Some of these latter bones are also broken, but the edges of the fractures are sharp and "new."

NO TRACE OF INVERTEBRATES

Another intriguing question posed by Sharktooth Hill is why the bone bed contains virtually no trace of invertebrates —astounding when one considers that there are remains of sharks, rays, bony fishes, sea turtles, shore birds, sea lions, baleen whales, a sperm whale, porpoises, and an extinct hippopotamus-like animal called a desmostylid. In short, most of the vertebrates that one would expect to find along the shores of North America today are well represented in the Sharktooth Hill fauna. It seems like a typical assemblage except that there are neither marine plant fossils, nor remains of corals, crabs, clams, snails, sand dollars, or any of the other common marine invertebrates found on the bottom of the sea near shore. Even microscopic organisms are absent. This condition is even more striking when one considers that there are almost fifty species of vertebrates found in the bone bed.

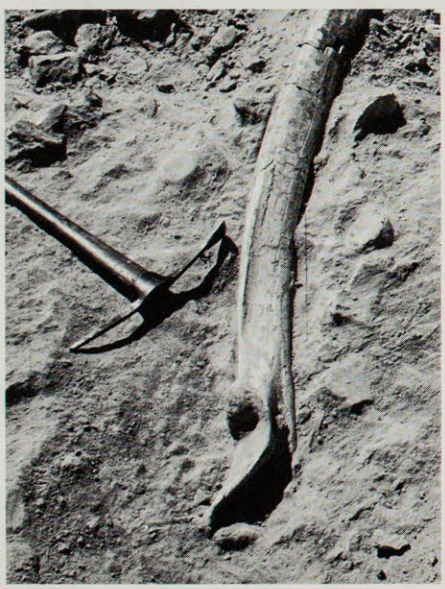
Differential preservation of invertebrates might be offered as a solution to this problem. Yet this does not take into account the fact that the hard parts of some of the invertebrates that could be expected to occur in the bone bed are composed of various substances, some similar in composition to bone.

These are only two of the many interesting problems still waiting to be solved at Sharktooth Hill. The complete story is a very complex one and has many interrelated parts.

MUSEUM EXCAVATION

With these and other problems in mind, the Los Angeles County Museum systematically attempted to gather specimens and data in October of 1960. A bulldozer was obtained and up to fifteen feet of overlying siltstone was scraped off the bone bed at a spot on the southwest flank of Sharktooth Hill. The bones and teeth were then exposed by means of awls and whisk brooms, and the relationships noted before removal. This ex-

Jaw bone of a toothless whale uncovered in the Sharktooth Hill bone bed. J. H. Lipps photo.



Whale vertebrae aligned after excavation from "bone bed."

cavation was about forty by sixty feet, though not all of this area was actually excavated.

Within hours, a definite pattern began to emerge. Many of the bones are randomly packed in the bone bed and further work is needed to determine the reason for this. However, large scale excavation revealed that many of the broken fragments are actually associated, and sometimes can be pieced together. For example, the partial skull and jaws of a whale were spread over an area at least seven feet long and four feet wide.

That shark teeth and small bones occur in pockets, a fact long known to serious shark tooth collectors, was also observed. This phenomenon agrees with the fact that many large bones and partial skeletons found in the quarry are in close alignment, that is, they are parallel to one another. Such evidence indicates that currents may have oriented the fossil bones and may have been responsible for sweeping teeth into pockets behind large bones or groups of bones.

SEA LION SKELETON

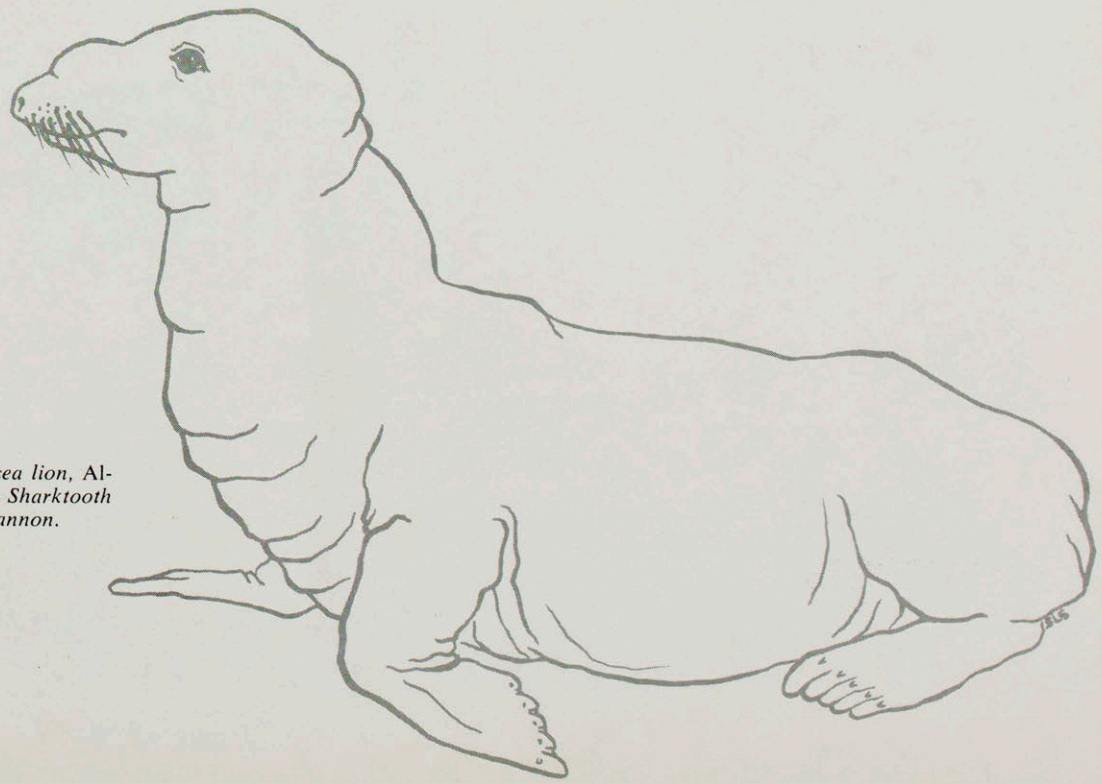
One of the highlights of the quarrying operation was the discovery of an almost perfect skeleton of Kellogg's sea lion, *Allodesmus*. Although known from earlier collections, this sea lion previously was represented by only partial and, for the most part, broken bones. The skull was virtually unknown. The skeleton recovered from the quarry is by far the best skeleton of Kellogg's sea lion, or of any extinct sea lion, yet known to science. It was so complete that even the penis bone of the male was recovered. Detailed study of this skeleton will yield much information on the evolution of sea lions in general, and a restoration can now be constructed.

Over a ton of bones and teeth were gathered in a short time, but it will take years to clean, catalogue, identify, illustrate, and describe the specimens. Nevertheless, the fact is established that careful, large-scale collecting operations at Sharktooth Hill can and will yield rich dividends. Where previous collections have contained part of a jaw or leg bone, the quarry in many cases yielded nearly complete jaws and leg bones. Many of the vertebrates known from the hill are based on only one or a few bones. A case in point is the Delphinidae, or porpoises. Most of the species known from the bone bed were described from ear bones, which happen to be among the most diagnostic bones in the body of a porpoise. Very few skull fragments of porpoises have been described from the bone bed, though many other finds of fossil porpoises in western North America are skulls or partial skeletons, often without the ear bones.

In order to equate these specimens with the species known from the ear bones at Sharktooth Hill, complete skulls and skeletons of the Sharktooth Hill species must be found. Additional excavations will probably go a long way toward eliminating this inequality. Once a set of controls can be established, it may be possible to use cetacean ear bones and skulls as evidence for long range correlation of fossil deposits on the west coast.

The quarry yielded some specimens representing terrestrial mammals, evidently individuals that were washed into the sea from the neighboring land. This raises the possibility of precise correlation of this marine deposit with nonmarine sediments containing mammalian assemblages.

Clearly, more field work will yield innumerable specimens and needed information. The returns from Sharktooth Hill far exceed the money spent and time invested. The Los Angeles County Museum is fortunate in having the facilities to carry out this work, the cooperation and interest of the Southern Pacific Company, owners of the land involved, and numerous serious collectors who have made outstanding discoveries and additions to the scientific knowledge of Sharktooth Hill.



Artist's restoration of Kellogg's sea lion, Allodesmus, *based on skeleton from Sharktooth Hill. Drawing by Miss Sharon Shannon.*

Beaver Trap
Lacquered Gourd Bowl
Key Hole Urchin-Red Sea Fan
Sabre Tooth
Fossils
California Shells
CAL INDIAN

DO YOU WANT TO BORROW A SMALL MUSEUM ?

DR. JOHN E. BAUR, *Division of Education*

Museums are tantalizing. You can see the wonders of the earth and the many achievements of man, marvel at color and texture, enjoy workmanship of historical, artistic, or scientific importance —from a distance. "See, but not too close," is as common a commandment of museums as "keep off the grass" is the watchword of a park.

The Museum's Lending Service is different! A teacher, graduate student, artist, lecturer, or your next-door neighbor, who is not satisfied with a glance into a thick glass case or a roped-off area, can borrow for two weeks an object he wants to *know* by touching, if that is possible; if not, then by hefting it, turning it to catch the light, and, as is usually the case, teaching its significance to others, particularly kids.

This is why the Lending Service exists. Its purpose has always been to give intimate and extended information on history, natural science, and the arts to anyone living in Los Angeles County who is both responsible and interested.

About 90 percent of the borrowers are instructors in public or private schools. They know from extensive experience that their students remember better, enjoy more fully, and understand more deeply the time and place they are studying if the unit is illustrated with pictures, slides, or better yet, three dimensional objects. These objects are often "realia," the real McCoy, actual objects used in colonial times or in ancient Egypt, or among some South Sea islanders. Three-D might include as diverse specimens as a mounted bird from Canada, a tar-impregnated fossil bone from La Brea pits, or fabrics woven by descendants of Peru's ancient Incas.

Teachers come great distances in our sprawling county because they know that there is not another institution in Southern California, or perhaps in the entire West, which can supply them with a great variety of well-labeled, well-packaged, and relatively scarce items of authenticity and value in several dozen fields of study for elementary and secondary schools.

Occasionally university faculty members find that even for more advanced studies such objects as bird-study skins, mammal skeletons, and insect collections, or the extensive array of color slides and mounted pictures cannot be readily duplicated in college collections, libraries and laboratories.

The Lending Service staff has no inflated concept of the collections it preserves, repairs, adds to, and guards. Obviously, the Museum's most valuable specimens from the natural sciences, its rarest historical artifacts, and the finest art objects are not found in the Lending Service. The "stuff" offered for loan reflects the interests of the Museum and its general holdings. These items, though of high quality, are the expendable specimens, replaceable, but nonetheless important. Perhaps, because of the total amount of learning they inspire over their years of use, they are nearly as important as the priceless relics and masterpieces. Many students, teachers, and lecturers think so, for the untouchable "treasures" in the galleries have never done more for them.

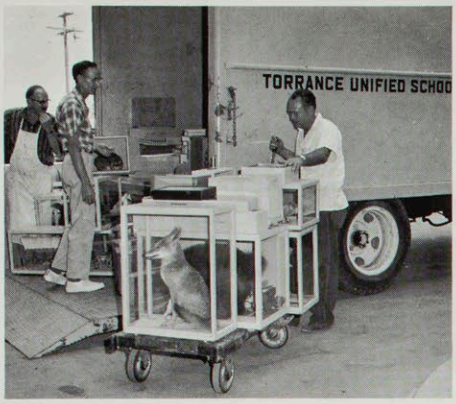
The history of the Lending Service is a success story. It is an account of at first slow, but recently, increasingly fast progress. In August of 1926, the "Extension Division" was established as part of the Museum. It was a "Library of Pictures," the ancestor of the present Lending Service's collection of over 50,000 mounted illustrations on "nearly any subject known to man." These pictures were lent out to schools and clubs by Sara Angela Newton, then in charge.

In 1940, the Museum's administration underwent great changes. The Division of Education was then created to unify all educational activities of the Museum: lectures, student workshops, and lending functions. Virginia H. Stoneman (retired in 1958) and Betty Murphy headed the new Lending Service until 1943. That year Dorothy W. Weatherhead came to the Museum, and since that time has been in charge. During the years of World War II, with the restriction on driving, the Lending Service grew slowly. William K. Good joined the Division in 1951 as preparator, making possible the repair, boxing, and attractive presentation of objects.

During these years of slow growth, the Lending Service supplied mainly individual borrowers. Teachers borrowed their limits and told others about the outstanding facilities. The Service's values could not then be extended to mass output because of the limitation of funds and the gradual deterioration of material, for many of the birds, pictures, and models then on loan were a quarter of a century old. Personnel was limited to Mrs. Weatherhead and Mr. Good, who were kept fully occupied with the acquisition, maintenance and lending of materials.

The first step toward expansion was made in 1956 when, through an arrangement with Rancho Los Amigos, a social rehabilitation service of the County, its personnel was employed in boxing Lend-

An overview of a Basic Unit of Instructional Materials which is distributed to each of nineteen County School Districts.



Basic Unit of Materials being loaded into Torrance School District truck.

Lending Service personnel checking material out to individual borrowers.

Mr. W. K. Good and Mr. Robert Raitch, preparators, in their work room.

Mrs. Dorothy W. Weatherhead—Museum Education Advisor in charge of the Lending Service.

ing Service objects so that the more fragile would survive. They mounted hundreds of new pictures and made innumerable objects useful to the schools in their study of Western American pioneer life.

Another great break for the Lending Service was the County's decision to allow it to charge a 50 cent fee for each period of borrowing. Furthermore, this money, instead of being pooled with general County funds, was to be used by the Service to buy new items, repair older ones, and present materials more meaningfully. Mrs. Weatherhead was able to visit several of the better antique stores and fairs and acquire authentic pioneer objects previously not available for classroom use. On her annual vacations abroad she also has taken fine color slides and purchased inexpensive but educationally valuable specimens from virtually all corners of the world.

More recently, replicas of Sir Francis Drake's famous "plate of brass" were reproduced and have proved a very popular item with schools. Modelmaking is becoming an occasional—and may become a regular—activity allied with the Lending Service. For example tabletop-size scale models of San Gabriel Mission as it appeared about 1830, with outbuildings and handicraft areas, have just been made and ingeniously boxed for classroom tours.

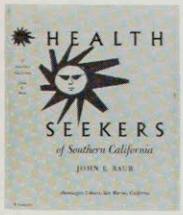
In September of 1961, Robert Raitch joined the Lending Service staff as preparator working with Mr. Good. With extended personnel, there is time and talent for serving an ever-increasing number of schools and individual classes.

Since 1958, a successful program of lending to school districts has been developed. The district pays a $300 fee and is allowed to borrow for the nine-month school year a large selection of materials pertaining to history, science, and art. The district lends these out to schools and teachers in its jurisdiction, and returns to the Museum the following summer all materials for inventory and repairs. This plan eliminates many trips by individual instructors and extends the area covered by the Service. With the expanded collections of the Service, there are still enough items on hand on the Museum shelves for borrowing by individual teachers whose districts are not yet under this plan. The program began with 3 school districts and now includes 19.

As the Lending Service becomes "big business," its rules and regulations become better organized. Definite limits are set on how many items of certain categories may be borrowed for the 14-day period. No reservations, renewals, or deliveries are possible. There is a late fine of 15¢ per day. Even so, the teachers have always felt the money involved was small compared to the good results. Anyone of college age and over who lives in Los Angeles County may borrow.

There are also specials aids to borrowers. For example, over the years the staff has carefully prepared an extensive Data Card File. These hundreds of cards may be borrowed along with the items which they explain in detail. Data cards save borrowers the trouble of searching through innumerable books for this information, some of which is only easily discovered by specialists in the field.

This then is the fascinating universe of the Lending Service. It is a cross-section display of man's achievements and the world's wonders, a reflection on a smaller scale of the Museum itself. If you are a teacher, artist, lecturer, minister who believes that a picture is worth 10,000 words and a mounted animal perhaps half a million, call the Lending Service, or come in. All you need is incentive, a small fee, respect for public property—and imagination!



The Health Seekers of Southern California,
1870-1900 by John E. Baur
(The Huntington Library, San Marino, 1959; $4.50)

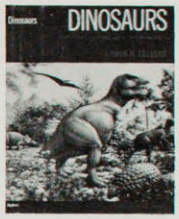
Of all the fantastic, almost legendary booms that have resounded throughout Southern California none perhaps has been more ignored by cultural historians than that cacophonous horde of the invalidic, maimed and ailing who sought the recovery of physical well-being, a commodity more precious than oil or gold or land. It was inevitable that a migration of health seekers should, in the declining decades of the last century, find this region the lodestone of their feverish desires for self-rejuvenation.

Above all considerations which attracted these most unlikely and ill-equipped pioneers to the Promised Land of the Golden West, was the "folklore of climatology." The obsessive intentness of local commercial interests to "sell" Southern California has, to this enlightened day, relied heavily upon its unique weather. Yet never were there such receptive listeners to this crescendo of ballyhoo than during the period Dr. Baur chronicles and recreates with admirable understanding. The recorded accounts are often pathetic though not unrelieved by some all-too-human antics of the onrushing seekers of health.

Author Baur's approach to this significant influx of the sickly is that of the dispassionate amasser of anecdotal and circumstantial evidence. He establishes a solid basis for his central thesis that the health seeker movement is not merely an innocuous historical curiosity, but one which left a permanent imprint on the future development of this area. Many of the established communities, Pasadena and Santa Barbara, for instance, were largely populated and settled by the unhealthy, who often showed gratitude for renewed vigor by becoming ardent propagandists and boosters of their particular paradise. Such influential, reconditioned residents as Professor Thaddeus S. C. Lowe of Mt. Lowe *(see page 4)* railroad fame, Abbot Kinney and Theodore S. Van Dyke became living testimonials to the salutary effects of this favored area, and they contributed mightily to its growth.

And today? Dr. Baur remarks that "the movement did not die out with the new century, nor could it even remain dormant. Apparently it is unending." But the special charm of the early migration has largely dissipated. Medical opinion no longer prescribes with such ignorant abandon change of locale for the tubercular, the asthmatic, et al. Governmental agencies have become increasingly active and responsible in the medical field. To a much greater degree the modern health seeker is immune to extravagant claims and desperate remedies. Yet the final word of the author is hardly uncharitable to the pioneer health seekers or to the sanctuary of their hopes. Dr. Baur writes: "They were willing to adapt to their new western home and Southern California offered them a freer life and a broader livelihood."

BURT REINER, *History Preparator*



DINOSAURS: Their Discovery and Their World
Edwin H. Colbert, E. P. Dutton and Co., Inc., New York, N. Y., 1961, 300 pp.
(150 illustrations) $7.50

Dr. Colbert, Chairman of the Department of Vertebrate Paleontology of the American Museum of Natural History, has written the most comprehensive book on dinosaurs available for the general public and particularly for young students. He has not only given excellent explanations, but has included the best photographic and diagrammatic material available to illustrate the skeletons and reconstructions of the animals.

The book opens with a fascinating history of the early discoveries of dinosaur fossils enriched by delightful stories of the experiences of the scientists working in this field in the early nineteenth century. He continues with an explanation of the methods of collecting, identifying and preparing the material for exhibition.

The high point in the book is the discussion of the life of the dinosaurs. Problems such as food, climatic conditions, the basic structural problems in skeletal development of the giant forms, egg structure, probable growth characteristics and theories regarding extinction are fully covered.

Various types of dinosaurs are described and a comprehensive classification included as well as detailed lists of dinosaur exhibits in the United States. The book also incorporates two valuable bibliographies, one designed for the layman and the other for those interested in technical papers and books in the field.

GRETCHEN SIBLEY, *Science Instructor*

These books and others are available at special discounts to Museum members at the Museum bookshop.

The Vultures of Cerro Viejo

DR. KENNETH E. STAGER,
Senior Curator, Ornithology

THE Santa Susana Pass Country is Indian country. Detachments of U.S. Cavalry pursue marauding bands of Indian renegades through the sandstone canyons of the Santa Susanas, or cut them off at the pass. Marshal Matt Dillon of television's "Gunsmoke" fame can also be found there in hot pursuit of bad men although the region is a bit distant from Dodge City. High in the air above the mountain tops or sailing just above the ridge lines on quiet wings are still other inhabitants of the Santa Susana Country. These are the vultures of Cerro Viejo.

Cerro Viejo is a large and well-kept ranch nestled among the rolling hills and broken ridges on the west side of the Santa Susana Mountains. Safe from Indian attack or theft from television cattle rustlers, the trim white ranch buildings and corrals of Cerro Viejo are the pride of their owner Mr. Patrick A. Doheny, a member of our Museum Association.

The hero of this little story is the turkey vulture *(Cathartes aura)* and the locale is Cerro Viejo ranch. It was here that Mr. Patrick Doheny permitted me to conduct an important piece of ornithological research.

The puzzling question whether or not vultures locate their food by vision or by olfaction has been argued since the time of Aristotle and Pliny. Up until 1826 it was generally believed that food location by vultures was accomplished by a keen sense of smell. In 1826, however, the early American naturalist, John James Audubon, presented what he considered to be valid evidence to show that vision rather than olfaction led vultures to their prey.

To Audubon's surprise, he found that instead of settling the question once and for all, he had only revived an argument that has continued to the present day. Compared with other classes of animals such as insects, fish, and mammals, the Class Aves, or birds as we know them, are not endowed with strong olfactory powers. Among the vast array of bird species throughout the world, however, there are certain groups that possess well-developed olfactory organs and behavior patterns to indicate that each of them makes use of an olfactory sense. The flightless Kiwi (Apteryx) of New

Zealand is a well known example, as are the albatross, shearwaters and petrels.

The question of a sense of smell among vultures can be partially clarified with the acceptance of the fact that the vultures of the world are divisible into two distinct groups. The vultures of the Old World—Europe, Asia and Africa—are known as aegypiine vultures and are closely related to the large hawks and eagles. An anatomical examination of the olfactory area of this group of vultures reveals an absence of the cellular structure necessary for a sense of smell.

The cathartine or New World vultures on the other hand are an entirely different group of birds and include the Andean Condor, California Condor, King Vulture, Black Vulture and the Turkey Vulture—*the hero of our story*. An anatomical examination of the nasal passages of all of these five species of vultures shows that among them the turkey vulture is uniquely equipped with a well developed olfactory sensory system. The presence of such development does not in itself prove that the bird employs the mechanism for food location. The necessary proof could only come by means of carefully controlled field experiments.

I have been pursuing this problem for a number of years and my vulture-watching has been carried on in many parts of the world. Evidence had accumulated to indicate that the vultures of the Old World employed only vision in food location, but the turkey vulture of the New World has repeatedly demonstrated its ability to locate hidden food free of all visual clues.

To assist me in the solution of this intriguing problem, Mr. Patrick A. Doheny placed all of the facilities of his ranch at my disposal for use as an outdoor laboratory, and the vultures of Cerro Viejo were my guinea pigs.

A number of controlled experiments were devised. One of the principal tests involved the use of a powerful exhaust fan mounted in a funnel-like tower that permitted delectable odors of fresh and decomposing animal tissue to be placed on predetermined air currents. Contrary to popular opinion, the turkey vulture forges close to the ground in search of food rather than soaring high in the sky. This low level flight places the bird in an optimum position to receive odor stimuli. Armed with this knowledge and having determined the wind directions in the canyons of Cerro Viejo, I was able to predict the exact direction the vultures would approach the tower if they were truly following an olfactory cue. The vultures repeatedly zeroed in on the odor-laden air currents and tracked the odors to the tower.

The machine was completely mobile as the fan motor was powered by a portable electric generator. The mobility of the device enabled it to be moved to a new test site under the cover of darkness, thus preventing visual detection by vultures during the hours of daylight.

The turkey vulture has excellent powers of vision as well as a keen sense of smell and it is obvious that it makes use of its sight in food location. Dead animals, such as cows, horses, sheep or deer are certain to be detected by the sharp eyes of the vultures if the carcasses are visible below. To test the role played by vision in food location by the turkey vulture, a series of experiments was contrived that provided some interesting results.

A mounted specimen of a female mule deer was prepared to resemble a dead animal in every detail. Under the cover of complete darkness, the mounted decoy was placed among the short weeds of an open pasture. During the following four days the pasture and decoy were kept under constant observation during the daylight hours and turkey vultures were repeatedly observed passing over the test area. Although it was in plain view, at no time during the four day period did a cruising vulture indicate the least amount of interest in the decoy. During the night of the fourth day the decoy was carefully removed and replaced with the fresh carcass of a recently killed mule deer, selected by the California Department of Fish and Game from carcasses recently killed on the highways by automobiles. The deer carcass was identical to the decoy in size and shape and was placed in the exact spot previously occupied by the decoy. Extreme care was given to such detail as turning the neck and head in the same direction as that of the decoy.

Observation of the pasture was resumed on the morning of the fifth day and by afternoon a total of four turkey vultures were observed circling near the carcass. The circling was not directly over the carcass but almost two hundred yards to the north. The four birds turned in a tight circle approximately 100 feet above the ground at a point where the pasture floor rose slightly towards a hillside. After a period of circling, one vulture soared directly over the carcass, circled once and then returned to the circling group 200 yards to the north. This action was repeated several times by single vultures with each one returning to the circling group. After several minutes of this behavior, one vulture flew directly towards the carcass, alighted and began feeding. The other circling vultures immediately followed suit and soon all were busy feeding upon the deer.

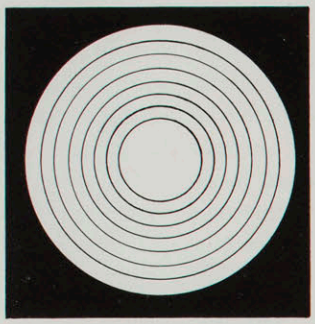
Wind direction in the pasture was known to be from south to north, and, from the behavior of the vultures, it was evident that the circling to the north of the carcass was at a point where the air currents were deflected upward by the slope of the hill at the north end of the pasture. The vultures were obtaining an olfactory stimulus at this point and this, in turn, served as the necessary releasing cue for feeding behavior. The mere sighting of a carcass was not enough proof that food was awaiting them, but once the sighting had been verified by the odor on the low level air current, the vultures readily came to the deer to feed.

Repeated experiments of this type, as well as numerous other techniques employed at Cerro Viejo, have provided ample data to show that the turkey vulture truly follows its nose to the dinner table.

The full results of this interesting study are to be published shortly as a lengthy scientific paper. The story here is intended only to cover the highlights of the research at Mr. Doheny's ranch.

The vultures of Cerro Viejo leave the Santa Susana Country each fall for their long migration to Central America. Each spring finds them once again cruising the ridge lines of the Santa Susanas while the U.S. Cavalry and "Marshal Dillon" shoot it out with the Indians and the bad men down below. The motion picture camera may fool the television audience, but the vultures of Cerro Viejo are not deceived by the "dead" Indians and bad men strewn over the landscape below.

MUSEUM SPOTLIGHT



MUSEUM CONFERENCE IN PALM SPRINGS

The Twentieth Annual Western Museums League Conference was held in Palm Springs from October 5 through 7 with Ruth I. Mahood, Chief Curator of History, as the 1961-62 President. Members of the Museum staff appearing on the program were Dr. Herbert Friedmann, Henry Wylde, Russell J. Smith, Robert E. Wade, Frances Nugent, Dr. John Baur, and Gretchen Sibley. A number of other staff members also attended.

JAMAICA FISH COLLECTING A SUCCESS

The cooperative venture between the Museum Associates (through the Section of Marine Zoology) and the United States Fish and Wildlife Service was successful and productive, according to Dr. David K. Caldwell, Curator of Marine Zoology. The venture was the chartering of the exploratory fishing vessel *Oregon* for two days of trawling, primarily for fishes, off the south coast of Jamaica.

Nearly 2000 fish specimens and a number of invertebrates have already been received at the Museum. While this is all of the material from off Jamaica, Dr. Caldwell has received notice that additional specimens collected off the Caribbean coast of Central America will be deposited in the research collections here.

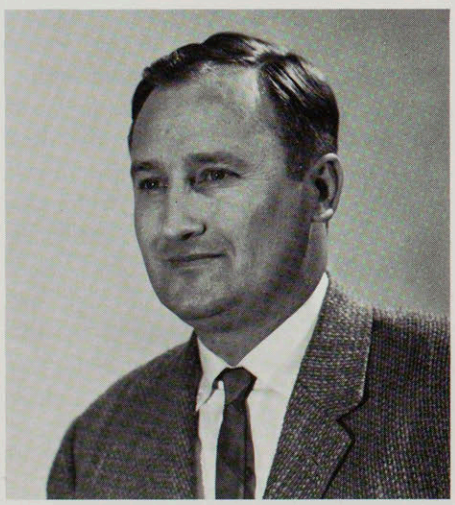
NEW CURATOR— MINERALOGY

Announcement has been made by Dr. Herbert Friedmann, Director of the Los Angeles County Museum, that Mr. Robert Gaal has received an interim appointment as Curator of Mineralogy. He will occupy this post until June 1963 while Randall T. Chew III is on leave of absence to lecture in East Pakistan under the Fulbright program.

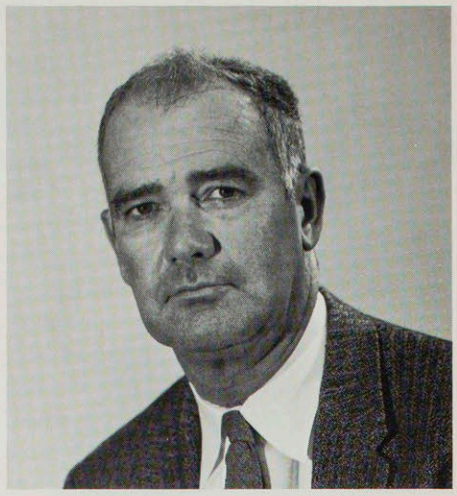
Mr. Gaal came to the Los Angeles County Museum this fall from the U.S.C. Campus, where he has been preparing his Ph.D. thesis, after serving a year as petroleum geologist in the Philippine Islands. Three years ago he worked at the Museum as a student assistant under then Curator of Mineralogy, Dr. Thomas Clements.

Gaal received his B.A. degree at U.C.L.A. in 1953, and his M.A. degree at U.S.C. in 1958. He spent three summers as ground water geologist with the U.S. Geological Survey in southeastern New Mexico. During 1959-60 he was a research staff member aboard the Oceanographic Research Vessel Velero IV.

Robert Gaal



Dr. James Reid Macdonald



NEW CURATOR— EARTH SCIENCES

The appointment of Dr. James Reid Macdonald as curator of vertebrate paleontology at the Los Angeles County Museum has been announced by Dr. Herbert Friedmann, Museum Director.

Dr. Macdonald came to the museum on September 1 from the University of Idaho where he was Associate Professor of Geology. He is an authority on fossil mammals of the Cenozoic of the Great Plains and the western states and will contribute much to further development of the Museum's rapidly growing section in Vertebrate Paleonotology.

Succeeding former Curator of Vertebrate Paleontology, Dr. Theodore Downs, who is now Chief Curator of Earth Sciences at the museum, Dr. Macdonald will be in charge of the new vertebrate paleontology facility on which construction began in November.

A native Californian born in St. Helena on August 22, 1918, he was graduated from the University of California, Berkeley, with a B.A. degree in Paleontology in 1940. He received his M.A. and Ph.D. degrees at Berkeley in 1947 and 1949, respectively. He has held teaching and research posts at the Museum of Paleontology, University of California, South Dakota School of Mines and Technology and the American Museum of Natural History, New York. In 1960 he planned the reorganization of the Idaho State Police and in 1961 served for six months as Deputy Director of Administration for the State of Idaho. He is a member of leading professional societies and has published almost 50 scientific papers in the field of vertebrate paleontology.

NATIONAL SCIENCE FOUNDATION GRANT

Dr. Macdonald brings with him a grant from the National Science Foundation which will be administered by the Los Angeles County Museum Associates. The grant for $16,800 was made for the support of research entitled "Geology and Paleontology of the Wounded Knee Area, South Dakota." This is the eighth major grant in slightly more than four years to be received by a member of the Museum's staff, and the sixth to be awarded by the National Science Foundation.

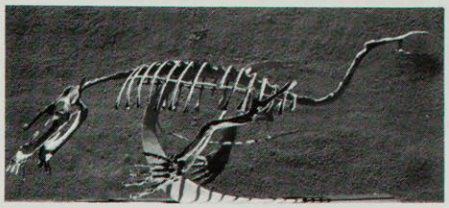
The grant, which takes effect immediately, is for a period of two years, during which Dr. Macdonald will be enabled to further his research in a field in which he is a recognized authority—fossil mammals of the Cenozoic. The problem will involve modern approaches to a classic fossil bearing area in South Dakota and will result in considerable additions to the Museum's exhibit and research collections.

We welcome Dr. Macdonald to the science staff. The public will indeed benefit from his knowledge and service.

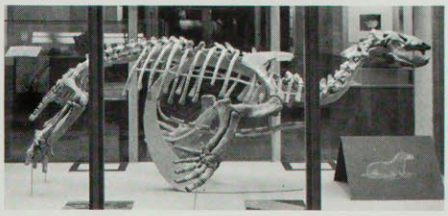
RESEARCH GRANT—LIFE SCIENCES

Dr. Fred S. Truxal, Chief Curator of Life Sciences, has received confirmation from the United States Army Medical Department Research and Development Command that funds have been allocated for the second of four years research work on ectoparasites in Costa Rica. The authorized sum of approximately $15,000 will finance the field and laboratory investigation on this project for the coming year. This research program which was initiated last summer will involve collection of information and specimens in Costa Rica as well as interpretation of the data assembled. Other members of the Museum staff working with Dr. Truxal on this investigation are: Dr. Charles A. McLaughlin, Curator of Mammalogy, Dr. Andrew Starrett, Research Associate and Associate Professor of Biology at Northeastern University, Boston, Massachusetts and Mr. Richard S. Casebeer, Research Assistant and Graduate Student at the University of Southern California. Mr. Casebeer is presently in Costa Rica where he will spend 14 months working on the project.

Fiber glass mount for fossil Sea Lion Skeleton.



The finished exhibit.



FIBER GLASS FOSSIL MOUNT

A feature attraction of the successful Recent Asquisitions show by the Science Divisions during August-September, was the unique fiber glass armature that supported the fossil sea lion skeleton, *Allodesmus*. Those who viewed it frequently commented on the functional and aesthetic qualities of the work, conceived by Leonard C. Beesom, Senior Preparator in Vertebrate Paleontology, assisted by modelmaker Carl Gage and Floyd E. Humeston.

Why was a fiber glass armature used in this mount? When properly made it can be a very strong unified structure and also permit removal of parts of the skeleton from the armature, if desired. It allows for great variability of positions in which a skeleton can be mounted since individual units of the mount can be fused together in the position desired.

Fortunately Mr. Bessom happens to thrive on experimenting with new methods! The Museum would be at loss indeed without his inventive genius. He has had experience making many other things from fiber glass—a sixteen-foot boat at his home and a seventeen-foot life-size Killer Whale restoration for Marineland of the Pacific. Mr. Robert Jordan assisted him in these projects.

There may be other fossil skeletons suitable for this method of exhibition and it is hoped that all the problems may be worked out on the basis of experience from this first attempt.

Museum visitors will be interested to know that the almost perfect fossil sea lion skeleton from Sharktooth Hill is now on permanent exhibition on the mezzanine floor of Hancock Hall next to its "sister" specimen from Palos Verdes Hills.

Frances Nugent.

FRANCES NUGENT ON YEAR LEAVE

Frances Roberts Nugent, Staff Instructor in Art, is on leave from the Museum for eleven months beginning officially on September 1, 1962 and returning on August 1, 1963. During this time she will be teaching at San Fernando Valley State College where she plans to offer two courses in art history and two classes of art survey.

There are several purposes for Miss Nugent's leave. On several occasions she has been invited to teach at San Fernando Valley State and now has accepted the offer. The change of pace after fifteen years at the Los Angeles County Museum will give her an opportunity to reacquaint herself with students of college age and experience.

When not teaching she plans to lay the groundwork for a series of publications on art education for senior high school and beginning college students to be based largely on objects which can be seen in public collections of Southern California.

Frances Nugent sees this fall as a landmark in her career in art education. Her new book, JAN VAN EYCK: MASTER PAINTER, was published by Rand McNally Company on October 19. First in a projected series, it is aimed at elementary-age children, particularly those of fifth and sixth grades. The second in the series, GEORGE BELLOWS: AMERICAN ARTIST, will probably be published during the fall of 1963. These books, written and illustrated by Miss Nugent, are the fruitful harvest of her work carried on with children at the Museum over the past few years in conjunction with the Los Angeles City Schools art programs.

Los Angeles County Museum
Exposition Park, Los Angeles 7, California
Return Requested